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氏名	中島　雅大
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学位論文の題名	Biological Effects of Continuous Low-Dose-Rate Irradiation in Silkworms and Mice: Growth Promotion and Tumor Transplantability （蚕とマウスの成長促進と腫瘍生着における低線量率持続被曝の生物学的効果）
論文審査担当者	主査：　高橋 智 副査：　稲垣 宏，大石 久史

Abstract
[Purpose]
A previous study showed that continuous low-dose-rate irradiation promoted the growth of silkworm larvae. This study aimed to confirm that finding, determine the optimal dose rate for growth promotion, and compare low- and high-dose-rate irradiation in silkworms, while also investigating the effects of the radiation-emitting sheet on growth and tumor transplantability in mice.
[Materials & Methods]
Silkworm eggs were placed on low-dose-emitting sheets with 4 different dose rates (g-ray rate: 1.7 -22.4 mSv/hour) or on control sheets. The other groups of silkworm larvae received single whole-body X-irradiation (0.1-50 Gy), and subsequent body weight changes were monitored. Starting at 3 weeks old, Balb/c mice were bred on the same sheets, and body weight change was measured. Seven weeks later, the mice were used to investigate the transplantability of EMT6 tumor cells cultured in vitro.
[Results]
The silkworms bred on the 13.4- and 22.4-mSv/hour sheets became larger than the control. Single 50-Gy irradiation suppressed the growth of silkworms. An increase in the time to EMT6 tumor development was observed in low-dose-rate-irradiated mice.
[Conclusion]
This study confirmed growth promotion of silkworms by continuous low-dose radiation and demonstrated growth suppression at a high dose rate. Growth promotion was not observed in mice; further studies using higher dose-rate sheets may be warranted.